

Second Review of the Paper: "Simulated Mixing in the UTLs by Small-Scale Turbulence Using Multi-Scale Chemistry-Climate Model MECO(n)" by Chun Hang Chau, Peter Hoor, and Holger Tost

The revised version of the manuscript does not sufficiently address the major comments raised in the initial review. In many cases, the authors' responses are not reflected in the revised text, or only marginally so. I strongly recommend that the authors carefully read all reviewer comments, revise the manuscript accordingly, and ensure that the responses are clearly visible and well-integrated into the main text.

Model Validation

The response to Comment 1 is not adequately incorporated into the revised manuscript. Aside from a brief addition in Section 3.1, no substantial changes are evident. Furthermore, the limitations of the modeling approach -- explicitly raised in the original review -- are still not clearly discussed in either the Introduction or the Conclusions.

Sponge Layer

The revised manuscript should include a clear comment on the validation of the sponge layer depth, as provided in the authors' reply. Currently, this is missing.

Simulation Setup

Figures 1 and 2 presented in the reply contain important information but are not discussed or included in the revised manuscript. The paper should be rewritten to incorporate and discuss these figures.

Missing Simulation Details

It remains unclear why the details provided in the authors' reply were not integrated into the revision. In addition, instead of the 2D plot shown in Fig. 3, a vertical profile will be sufficient. Key information is still lacking -- regarding the width of the transition layer.

Analysis of Mixing and Exchange

In their reply, the authors state:

"The fluxes would be difficult to compare with the tracer-tracer correlation since it shows an accumulation of tracer due to advection of mixed air from other events."

If this is indeed the case, it raises fundamental question:

- Why are individual events analyzed at all, if they cannot be clearly separated?
- Why is this critical limitation not explained in the manuscript?